

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Prior Application: SU et al.  
Serial No. 09/571,597  
Filed: May 15, 2000

Group Art Unit: 1713  
Examiner: F. Zitomer  
For: SOLVENTLESS NONTOXIC HIGH  
REFRACTIVE INDEX AND LOW  
BIREFRINGENCE ORGANIC-INORGANIC  
HYBRID MATERIALS

Honorable Commissioner for Patents  
Washington, DC 20231

**PRELIMINARY AMENDMENT**

Sir:

Prior to examination, please amend the above-identified Divisional application as follows:

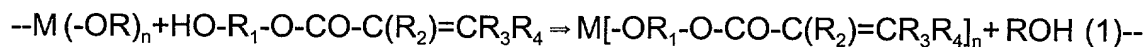
**IN THE SPECIFICATION:**

Please replace the paragraph beginning at line 11, page 3, with the following rewritten paragraph:

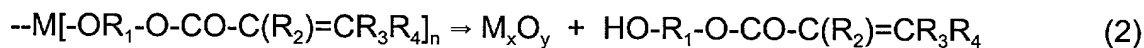
--In the first step, the solventless metal aliphatic acryl alkoxides are synthesized. They have the general formula of  $M[-OR_1-O-CO-C(R_2)=CR_3R_4]_n$ . Where the M is a metal element or a mixture of metal elements. The metal can be selected from the metals in the periodic table except toxic metal such as lead. The metals with the atomic number greater than the silicon element is preferred. The n value is dependent on the valence of metal. Where R1 is a straight chain alkyl group or branched alkyl group. The straight chain is preferred with the formula of  $(-CH_2-)_n$ . Where n is equal to 1 to 12 and n is equal to 1 to 4 is preferred. Where R2, R3, R4 can be a hydrogen atom or straight chain alkyl group  $(-CH_2-)_n$  or branched alkyl group. The straight chain alkyl group is preferred, n is equal to 1 to 12 and n is equal to 1 to 4 is preferred. The metal aliphatic acryl alkoxides are synthesized either by reacting metal with acrylate alcohol or by reacting metal alkoxide with acrylate alcohol through an alcohol exchange. The alcohol exchange

is preferred, so a wide range of metal type can be selected. The alcohol exchange reaction is shown in the equation (1):--

Please replace the paragraph beginning at line 26, page 3, with the following rewritten paragraph:

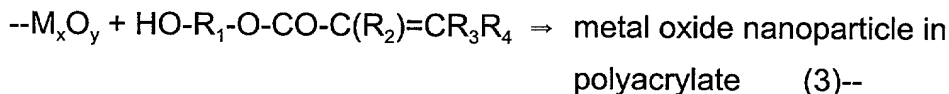


Please replace the paragraph beginning at line 10, page 4, with the following rewritten paragraph:



In suit metal oxide nanoparticle formation in acrylate  
matrix formation--.

Please replace the paragraph beginning at line 26, page 4, with the following rewritten paragraph:



#### **IN THE CLAIMS:**

Please cancel claims 1-5 without prejudice to or disclaimer of the subject matter recited therein.

Please add new claims 6-10 as follows:

6. (New) An organic/inorganic hybrid materials which are prepared from the hydrolysis of metal aliphatic acryl alkoxide compound having the general formula of  $M[-OR_1-O-CO-C(R_2)=CR_3R_4]_n$ , into a mixture of metal oxide nanoparticles and acrylate monomers, the particles are well dispersed in the acrylate matrix. Then the mixture is polymerized by free radical polymerization, and an organic/inorganic material is formed that contains metal oxide nanoparticles dispersed in polyacrylate.
7. (New) An organic/inorganic hybrid material contains metal oxide nanoparticles dispersed in polyacrylate as claimed in claim 1, wherein said the material exhibits high refractive index and low birefringence.
8. (New) An organic/inorganic hybrid material contains metal oxide nanoparticle dispersed in polyacrylate as claimed in claim 1, wherein said the material is useful for optical applications.
9. (New) A compound metal aliphatic acryl alkoxide compound having the general formula of  $M[-OR_1-O-CO-C(R_2)=CR_3R_4]_n$  as claimed in claim 1, wherein M is a metal element or a mixture of metal element, the metal can be selected from the metals in the periodic table except toxic metal such as lead, the metals with the atomic number greater than the silicon element is preferred such as titanium, bismuth, the n value is dependent on the valence of metal, while  $R_1$  is a straight chain alkyl group or branched alkyl group. The straight chain is preferred with the formula of  $(-CH_2-)_n$ , where n is equal to 1 to 12 and n is preferably equal to 1 to 4,  $R_2, R_3, R_4$  can be a hydrogen atom or straight chain alkyl group  $(-CH_2-)_n$  or branched alkyl group, the straight chain is preferred with the formula of  $(-CH_2-)_n$ , where n is equal to 1 to 12 and n is preferably equal to 1 to 4.

10. (New) A compound metal aliphatic acryl alkoxide compound having the general formula of  $M[-OR_1-O-CO-C(R_2)=CR_3R_4]_n$  as claimed in claim 1, wherein the compound metal aliphatic acryl alkoxide compound having the general formula of  $M[-OR_1-O-CO-C(R_2)=CR_3R_4]_n$  is  $Ti[-OCH_2CH_2-O-CO-C(CH_3)=CH_2]_4$ ,  $Bi[-OCH_2CH_2-O-CO-C(CH_3)=CH_2]_3$ , a mixture of  $Ti[-OCH_2CH_2-O-CO-C(CH_3)=CH_2]_4$  and  $Bi[-OCH_2CH_2-O-CO-C(CH_3)=CH_2]_3$  with the composition of  $\{Ti[-OCH_2CH_2-O-CO-C(CH_3)=CH_2]_4\}_{1.5}\{Bi[-OCH_2CH_2-O-CO-C(CH_3)=CH_2]_3\}_1$  --

**REMARKS**

An early action on the merits of this application is respectfully requested.

Respectfully submitted,

Date: January 30, 2002

By:

  
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